

BPD-5799-59

Copy 4 of 6

27 August 1959

MEMORANDUM FOR: Chief, Development Branch

ATTENTION : Mr. J. Parangosky

SUBJECT : Terrain Obstacle Warning and Avoidance Radar (TOWA)

REFERENCE : Trip Report - [redacted] 10 August 1959

1. As a result of the meeting on 10 August 1959 which we both attended, as well as [redacted] and others from Operations and Materiel, I have obtained the following information.

a. There are many TOWA programs in being or under development. The following are farthest advanced:

- 1) NAFI - U. S. Navy - as briefed by [redacted]
- 2) Red Tavern - Cornell Aeronautical Laboratories.
- 3) TOWA - Westinghouse.
- 4) NASARR - Autonetics Division, MAA.
- 5) University of Illinois System.
- 6) TOWA - Chicago Midway Labs.
- 7) APQ-58 - Bendix
- 8) PHS VEE - Cornell Aeronautical Labs.
- 9) XMH-3 - Bell Telephone Labs.

b. All three (3) military services, i.e., Army, Navy, and Air Force, have active interests in TOWA.

c. Although there are at least nine (9) systems in being or under development (para 1a above), only two (2) are in production - Navy's APQ-58 and Autonetics NASARR.

2. There are three (3) primary problems in TOWA:

- a. Designing an antenna that is small enough to fit on an airplane, and at the same time,
- b. Providing sharp definition to pick out small objects - TV towers, power lines, smoke stacks, etc.,
- c. Providing the necessary three (3) dimensional presentation. The geographic location of obstacles must be shown together with an indication of the obstacles' height.

3. I talked with [redacted] Headquarters ARDC, who monitors all TOWA systems (including AFG-53) for USAF and he is of the opinion that the Westinghouse TOWA offers the best promise; however, it is still in the development stage and will not be developed fully for at least a year. It portrays two (2) dimensions in a plane and uses color (red, yellow, and green) to depict distances in the 3rd dimension.

4. The Autonetics NASARR TOWA is similar in principle to the AFG-53, in that it is monopulse, and depicts only those objects that protrude above an arbitrary horizontal plane beneath the airplane. The principal differences are:

	AFG-53	NASARR
Wt.	30 lbs.	195 lbs.
Antenna Size	16" dia.	17" X 24" ellipses
Power Required	700 va AC	1,500 va AC 140 va DC
Forward Range	10 - 20 20 - 40	20 or 40 miles
Operating Freq.	9,375 mc	16,500 mc
Lateral Scan	NO	YES - 45° either side
Adjustable clearance plane	NO	YES
Cost	\$19,000	\$70,000

5. RECOMMENDATION: That one (1) AN/AFG-53A TOWA radar be procured and installed in [redacted] in lieu of the presently installed [redacted]

6. This recommendation is made for the following reasons:

a. The AFG-53A has much smaller antenna (16" X 16" vs 17" X 24") and will more readily fit existing airplanes.

b. The [redacted] can have the antenna placed in the nose of the airplane and not disturb the aerodynamics. If this system is housed in a pod under the wing of [redacted] it is possible that major aerodynamics problems may be encountered.

c. The APG-53A and APS-42 can serve essentially the same navigation purposes.

d. There is not sufficient improvement in the NASAP over the APG-53A to justify the difference in price.

7. In accordance with statements made in the 10 August 1959 meeting, this work involves the installation of existing equipment, APG-53A, in an existing airplane, [redacted], and is therefore a Materiel function. Recommend this project be assigned to Materiel Branch.

25X1

[redacted]

Developments Officer

25X1

DFD-DD/P [redacted] ancb

Distribution:

Orig. - Ch/DS

223 - Ops

4 - Mat

5 - DB - [redacted]

6 - RI

25X1

25X1